

Leota

Leota Overview

Volunteer monitoring began at Lake Leota in 1998 and continued through 2004. Recent data suggested that this city lake (Woodinville) was moderate in primary productivity (mesotrophic) with good water quality. Productivity appeared to be higher in 1998 – 2001.

Lake Leota has no public access points, though residents should keep an eye on aquatic plants growing nearshore to catch early infestations of Eurasian milfoil, Brazilian elodea or other noxious aquatic weeds. Lake Leota has recently experienced aggressive growth by a milfoil identified as native, *Myriophyllum verticillatum*.

Physical Parameters

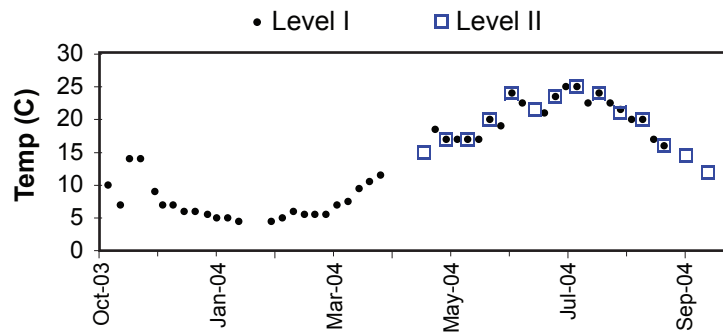
Secchi transparency ranged between 2.2 and 4.5 m through the year. The summer average was 3.6 m, which was in the upper middle range for all the small lakes monitored in 2004. Annual water temperatures ranged from 4.5 to 25.0 degrees Celsius. The maximum recorded was in the mid range for the lakes that were tracked.

Excellent precipitation and water level records were compiled for the year. Water levels were consistent with the regional pattern of winter-high levels, dropping slowly through the summer to a low stand in early fall.

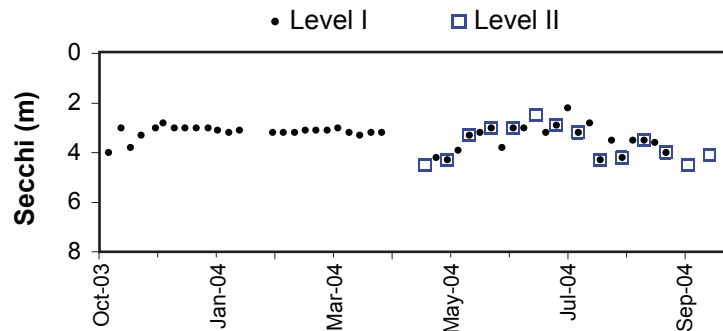
Nutrient Analysis and TSI Ratings

Total nitrogen generally decreased through the period, while phosphorus remained steady until mid October when there was an abnormally high value recorded. Aside from this date, the N:P ratio ranged from 19 to 65, averaging 47 which suggested

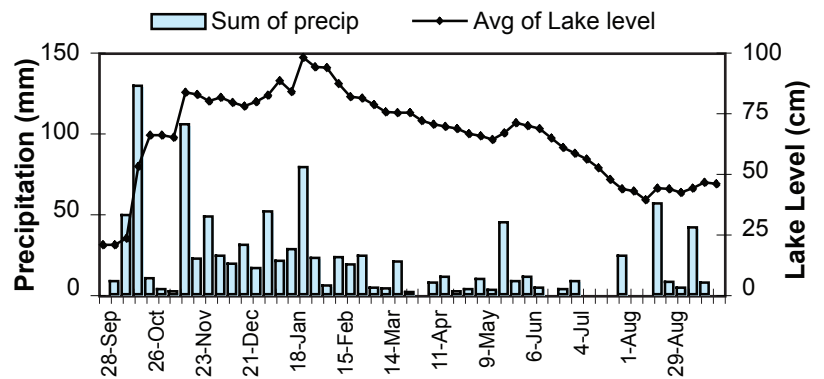
Lake Temperature



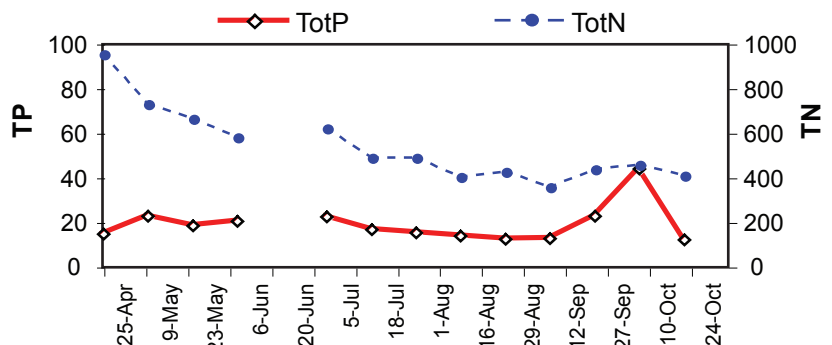
Secchi Depth



Lake Level and Precipitation



Nutrient Analysis



generally poor conditions for nuisance bluegreen growth.

Profile data indicate that thermal stratification was present early in the season and persisted through the summer. Relatively high concentrations of phosphorus were found in the deep water, suggesting there was some release from the sediments. Chlorophyll data indicated that algae were higher in abundance in the surface water than in middle of the water column.

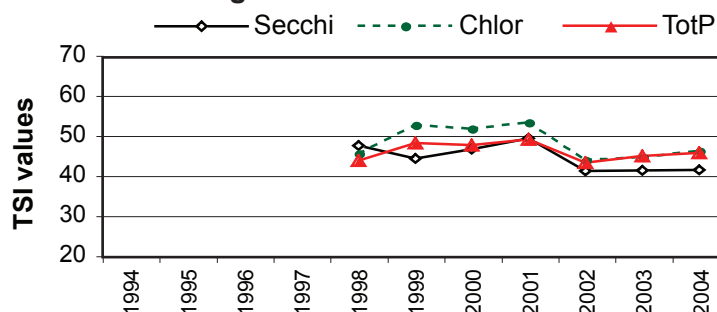
The 2004 TSI values were fairly close to each other in the mesotrophic range, with TSI-Secchi somewhat lower than the other two indicators, similar to 2003.

Chlorophyll Concentrations and Algae

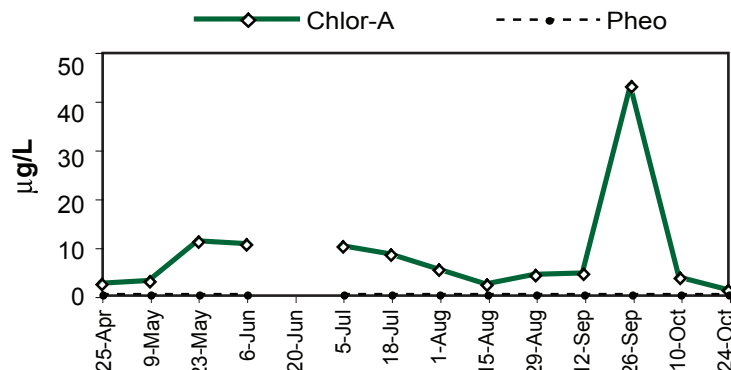
Chlorophyll remained fairly low through the sampling period until mid October when it spiked in late September, two weeks before the high phosphorus value. Commonly found algae in spring and summer included an unidentified chrysophyte species, *Synura*, and *Dinobryon*. The high peak in late September was due to a bloom of the dinoflagellate *Ceratium hirundinella*.

Date	Secchi	depth-m	degC	Chlor-A	TP µg/L	TN µg/L
5/23/04	3.3	1	17.0	10.90	18.5	670
		3	12.0	9.29	18.6	867
		6	6.5		114.0	1130
8/29/04	4.2	1	21.0	4.00	12.3	430
		3	17.5	1.40	9.5	328
		6	9.5		86.5	969

TSI Ratings



Chlorophyll a Concentrations (µg/L)



Common Algae

	Group
<i>Dinobryon spp</i>	Chrysophyta
Unidentified cells	Chrysophyta
<i>Ceratium hirundinella</i>	Dinophyta

2004 Level I Data

Daily Data Summary

Week of	Sum of precip. (mm)	# of days	Avg of lake level (cm)	# of days
28-Sep-03	0.0	4	20.5	4
5-Oct-03	8.0	6	20.4	7
12-Oct-03	49.0	6	23.0	7
19-Oct-03	129.0	7	52.7	7
26-Oct-03	10.0	5	65.7	7
2-Nov-03	3.0	6	65.4	7
9-Nov-03	2.0	6	64.6	7
16-Nov-03	105.0	7	83.3	7
23-Nov-03	22.0	5	82.4	5
30-Nov-03	48.0	6	79.7	6
7-Dec-03	24.0	6	81.1	7
14-Dec-03	19.0	6	79.1	7
21-Dec-03	30.5	7	77.6	7
28-Dec-03	16.0	7	79.4	7
4-Jan-04	51.0	6	82.0	7
11-Jan-04	20.5	6	88.1	7
18-Jan-04	28.0	7	83.4	7
25-Jan-04	78.5	6	97.7	7
1-Feb-04	22.5	7	93.9	7
8-Feb-04	5.5	7	93.3	7
15-Feb-04	23.0	7	86.7	7
22-Feb-04	18.5	7	81.6	7
29-Feb-04	24.0	7	80.7	7
7-Mar-04	4.0	7	78.0	7
14-Mar-04	3.5	6	75.1	7
21-Mar-04	20.0	7	74.7	7
28-Mar-04	1.5	5	75.0	7
4-Apr-04	0.0	7	71.6	7
11-Apr-04	7.0	6	70.0	7
18-Apr-04	11.0	5	69.1	7
25-Apr-04	2.0	7	68.3	7
2-May-04	3.0	7	66.1	7
9-May-04	9.5	6	65.3	7
16-May-04	2.5	5	63.9	7
23-May-04	44.5	7	66.6	5
30-May-04	8.0	7	70.7	7
6-Jun-04	11.0	7	69.6	7
13-Jun-04	4.0	7	68.1	7
20-Jun-04	0.0	6	64.4	7
27-Jun-04	3.0	7	60.6	7
4-Jul-04	8.0	6	58.0	7
11-Jul-04	0.0	7	55.7	7
18-Jul-04	0.0	6	52.0	7
25-Jul-04	0.0	7	47.4	7
1-Aug-04	24.0	6	43.4	7
8-Aug-04	0.0	6	42.4	7
15-Aug-04	0.0	7	38.9	7
22-Aug-04	56.0	7	43.9	7
29-Aug-04	7.5	7	43.3	7
5-Sep-04	4.0	5	41.9	7
12-Sep-04	41.5	6	43.9	7
19-Sep-04	7.0	6	46.0	7
26-Sep-04	0.0	5	45.4	5
Min	0.0		20.4	
Max	129.0		97.7	
Total	1019.5			

Weekly Data Summary

Sample date	Sample time	Secchi (m)	Temp (°C)	Algae* (Shore)	Algae* (at site)	Goose Count*
5-Oct-03	15:00	4.0	10.0	P1	P1	
13-Oct-03	17:00	3.0	7.0	P1	P1	
19-Oct-03	16:30	3.8	14.0	P1	P1	
26-Oct-03	16:00	3.3	14.0	P2	P2	
4-Nov-03	14:00	3.0	9.0	P1	P1	
9-Nov-03	13:00	2.8	7.0	P1	P1	
16-Nov-03	16:00	3.0	7.0	P2	P2	
23-Nov-03	14:00	3.0	6.0	P2	P2	
30-Nov-03	14:00	3.0	6.0	P1	P1	
8-Dec-03	15:00	3.0	5.5	P2	P2	
14-Dec-03	12:30	3.1	5.0	P1	P1	
21-Dec-03	13:30	3.2	5.0	P1	P1	
28-Dec-03	14:00	3.1	4.5	P1	P1	
18-Jan-04	12:30	3.2	4.5	P1	P1	
25-Jan-04	13:30	3.2	5.0	P1	P1	
1-Feb-04	12:00	3.2	6.0	P1	P1	
8-Feb-04	14:30	3.1	5.5	P1	P1	
15-Feb-04	14:00	3.1	5.5	P1	P1	
22-Feb-04	13:00	3.1	5.5	P1	P1	
29-Feb-04	16:00	3.0	7.0	P1	P1	
7-Mar-04	13:00	3.2	7.5	P1	P1	
14-Mar-04	17:00	3.3	9.5	P1	P1	
21-Mar-04	14:30	3.2	10.5	P1	P1	
28-Mar-04	13:00	3.2	11.5	P1	P1	
2-May-04	14:00	4.2	18.5	P1	P1	
9-May-04	15:30	4.3	17.0	P1	P1	
16-May-04	16:00	3.9	17.0	P1	P1	
23-May-04	13:00	3.3	17.0	P1	P1	
30-May-04	13:30	3.2	17.0	P1	P1	
6-Jun-04	13:30	3.0	20.0	P1	P1	
13-Jun-04	15:30	3.8	19.0	P1	P1	
20-Jun-04	17:00	3.0	24.0	P1	P1	
27-Jun-04	15:00	3.0	22.5	P1	P1	
11-Jul-04	15:00	3.2	21.0	P1	P1	
18-Jul-04	15:30	2.9	23.5	P1	P1	
25-Jul-04	15:00	2.2	25.0	P1	P1	
1-Aug-04	14:00	3.2	25.0	P1	P1	
8-Aug-04	17:00	2.8	22.5	P1	P1	
15-Aug-04	16:00	4.3	24.0	P1	P1	
22-Aug-04	15:00	3.5	22.5	P1	P1	
29-Aug-04	14:30	4.2	21.5	P1	P1	
5-Sep-04	8:30	3.5	20.0	P1	P1	
12-Sep-04	10:30	3.5	20.0	P1	P1	
19-Sep-04	12:50	3.6	17.0	P1	P1	
26-Sep-04	14:30	4.0	16.0	P1	P1	
Min		2.2	4.5			
Max		4.3	25.0			

* See introduction for discussion of algae assessment and goose count methods.

2004 Level II Data

Date (2004)	Temp (°C)	Secchi (m)	Chl-a (µg/l)	TP (µg/l)	TN (µg/l)	Algae Obsv.	N:P	Calculated TSI		
								Secc	chl-a	TP
25-Apr	15.0	4.5	2.08	14.8	959	1	65	38.3	37.8	43.0
9-May	17.0	4.3	2.72	22.7	735	1	32	39.0	40.4	49.2
23-May	17.0	3.3	10.90	18.5	670	1	36	42.8	54.0	46.2
6-Jun	20.0	3.0	10.40	20.4	586	1	29	44.1	53.5	47.7
20-Jun	24.0	3.0						44.1		
5-Jul	21.5	2.5	9.93	22.4	626	1	28	46.8	53.1	49.0
18-Jul	23.5	2.9	8.17	16.6	493	1	30	44.6	51.2	44.7
1-Aug	25.0	3.2	5.13	15.4	492	1	32	43.2	46.6	43.6
15-Aug	24.0	4.3	2.00	13.7	406	1	30	39.0	37.4	41.9
29-Aug	21.0	4.2	4.01	12.3	430	1	35	39.3	44.2	40.4
12-Sep	20.0	3.5	4.27	12.8	360	1	28	41.9	44.8	40.9
26-Sep	16.0	4.0	43.10	22.9	442	1	19	40.0	67.5	49.3
10-Oct	14.5	4.5	3.47	44.0	461	1	10	38.3	42.8	58.7
24-Oct	12.0	4.1	0.90	12.0	411	1	34	39.6	29.5	40.0
	Temp (°C)	Secchi (m)	Chl-a (µg/l)	TP (µg/l)	TN (µg/l)	Algae	N:P	Calculated TSI		
								Secc	chl-a	TP
Mean	19.3	3.7	8.2	19.1	543.9	1.0	31	41.5	46.4	45.7
Median	20.0	3.8	4.3	16.6	492.0	1	30	41.0	44.8	44.7
Min	12.0	2.5	0.9	12.0	360.0	1	10	38.3	29.5	40.0
Max	25.0	4.5	43.1	44.0	959.0	1	65	46.8	67.5	58.7
Count	14	14	13	13	13	13	13	14	13	13

TSI Average = 44.5